

## TWO NEW SPECIES OF REPTILIAN CESTODES

BY

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[These two new species were sent to us for determination by Dr. H. O. Mönnig, Research Officer, Onderstepoort, Pretoria, to whom we here tender our thanks.]

### *OOCHORISTICA THEILERI* n.sp.

Host: *Agama hispida*? Locality: Pretoria.

There are altogether forty specimens of this interesting worm, collected from a Lizard, which Dr. Mönnig believes to be *Agama hispida*, var. *distans*. With the exception of a single specimen to which we will refer later, all the mature specimens, *i.e.* specimens possessing egg-capsules containing embryos, are 4-8 mm. in length, with a maximum width of 0.85 mm. The scolex measures 0.3-0.4 mm. across the suckers, the latter measuring 0.14 mm. in diameter. The scolex is not separated from the strobila by any stricture or neck-like structure, and the latter maintains a uniform width of 0.76 to 0.85 mm. throughout its entire length. The segments are indistinctly separated from one another, and are all, excepting the last ones, wider than long.

The *Musculature* of the strobila is of special interest. Whereas the *Oochoristica* spp. usually possess two or three layers of longitudinal muscles, our species only possesses a single layer of bundles made up of longitudinal muscle fibres. A similar disposition is to be found in *O. zonuri* Baylis, only with this difference: that the latter species possesses 40 dorsal and ventral bundles made up of 15 to 20 fibres each, whereas *O. Theileri* possesses the weakest musculature that we have ever seen. There are about 25 bundles made up of 2 to 4, exceptionally of 5 to 6 longitudinal fibres. As these bundles are spindle-shaped, it often happens that on transverse sections there are only to be seen a few irregular bundles, between which

appear isolated longitudinal fibres. The transverse muscles are weakly developed, and the dorso-ventral ones very fine. Calcareous corpuscles are scarce.

The *Excretory System*. This presents the typical disposition of four winding vessels of which the two ventral ones are united by a fine network of secondary vessels. We have also noticed other ramifications, but have been unable to follow them up, owing to their minuteness.

The *Genital Organs* appear close behind the scolex, and develop very uniformly in all the specimens that we have examined. The male and female gonads attain their sexual maturity in the fifteenth to the eighteenth segment. They first of all develop slowly, then suddenly from the twelfth to the fourteenth segment onward they develop very rapidly. In the sixteenth to the nineteenth segment the ovary has almost entirely disappeared, and the egg-capsules have begun to form; the formation of the latter is terminated in the next five to six segments, then follow a small number of gravid segments (see fig. 1 B). The strobila are thus constituted according to their length, of 23 to 28 segments. The genital pores alternate irregularly, and open into a remarkably deep genital atrium, situated slightly anterior to the middle of the border of the segment. The genital atrium (see fig. 1) is as large if not larger than the cirrus pouch, and presents two peculiarities, namely, it is lined with a cuticula armed with minute spines, and beneath which there is to be found a distinct layer of sub-cuticular cells from which arise a radiating musculature which is lost in the parenchyma.

The bottle-shaped cirrus pouch is 0.12 mm. long, and has a very muscular neck, although the distal extremity possesses but a weak muscular wall. When evaginated, the stout *cirrus* is 0.1 mm. long and measures at its base 0.04 mm. in diameter. The basal portion of the cirrus is covered with the same spines as those lining the genital atrium. The cirrus and *ductus ejaculatorius* are surrounded by a sheath of muscles. There is a well-developed retractor muscle attached to the cirrus pouch. The *vas deferens* presents a few loose coils. The *testes*, 26 to 30 in number, are entirely situated behind the female gonads, and form two groups, which may occasionally meet in the mid-line when the segments are much extended. This disposition has as yet never been recorded from *Oochoristica* spp.

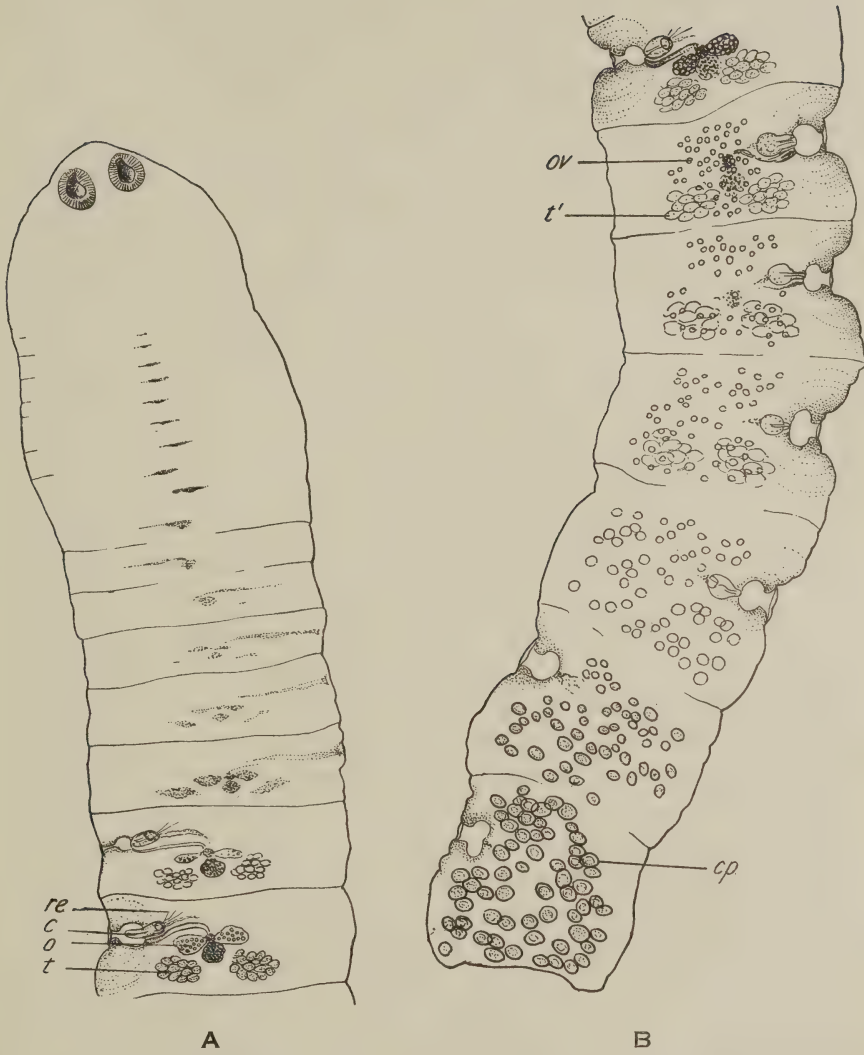


FIG. 1 A and B. *Oocboristica Theileri* n.sp. Mount of an entire worm. *c.*—cirrus; *cp.*—egg-capsules; *o.*—ovary; *ov.*—ova dispersed in the parenchyma; *re.*—retractor muscle of the cirrus pouch; *t.*—testes; *t'*—testes in regression.

As is usually the case in this genus, the *vagina* opens behind and on the same level as the cirrus pouch, and presents in its proximal portion a region as long as the cirrus pouch, possessing a thick muscular wall, and of the same diameter as the cirrus ; the vagina then forms a narrow tube which dilates near the ovary to form a small *receptaculum seminis*. The *ovary* is slightly displaced towards the poral side of the segment, and attains a maximum width of 0.2 to 0.24 mm. It consists of two wings, oval in shape, and not lobed ; the poral wing is slightly smaller than the aporal one. The yolk gland is almost spherical, and measures 0.08 to 0.1 mm. in diameter. The shell gland is situated dorsally, and is 0.06 mm. in diameter ; it surrounds a very distinct ootype.

We have already remarked on the fact that both the male and female genitalia attain their sexual maturity in the same segment ; this is, nevertheless, contrary to what occurs in most Cestodes. The testes, however, still persist in several segments, whereas the ovary and the yolk gland disappear suddenly from one segment to the next. In mature segments, there appears between the male and female genitalia a sac-like uterus, which in the next segment has formed out-pocketings, especially anteriorly. These diverticula are filled with ova ; in the next segment, however, they form as many capsules as there are ova, each ovum being thus enclosed within a capsule. The segmentation which begins as soon as the ova enter the uterus, continues its course, and four segments further on, *i.e.* six segments posterior to the mature female gonads, the egg-capsules are definitely formed. These capsules can be easily distinguished, as they stain very deeply ; they seem to be formed of a hard and fragile substance, because on sections the capsules are broken into polygonal pieces showing a clean fracture. First situated in the field between the excretory vessels, the capsules partly push their way beyond the latter, and even beyond the nerve stems. The capsules are 0.06 mm. in diameter, and the embryos, surrounded by a very thin membrane, measure 0.03 to 0.04 mm. in diameter.

Whereas the number of ova contained within the ovary exceeds 200, we have never found more than 100 egg-capsules, each containing a single egg. One must, therefore, admit that when the ovary disappears suddenly, more than half the ova are unfertilized, and are resorbed. There are from 60 to 100 capsules per segment. On

several occasions we have found in a single strobila segments containing only 20 capsules, along with about 70 very small capsules presenting the aspect of calcareous corpuscles, and which are nothing else than aborted embryos, the abortion being due to inadequate fertilization.

As we have already mentioned above, our material contains a much larger specimen possessing the same anatomy. This species, *O. Theileri forma major*, presents, however, certain peculiarities with regard to the development of the sexual organs, and to the number of uterine capsules.

The specimen is 30 mm. long and has a uniform width of 1.7 mm. The *scolex* measures 0.5 mm. across the suckers; the latter are small and only measure 0.14 mm. in diameter. Immediately behind the suckers, the *scolex* widens out to attain the width of the anterior part of the strobila.

The *Sexual Organs*, and especially the female gonads, attain their maturity only in the forty-fifth segment, whereas in the other species examined they were already mature in the sixteenth or seventeenth segment. In the forty-sixth segment the female gonads have entirely disappeared, and the ova are surrounded by the uterine capsules, which attain their full development in the seventieth segment. The last thirty-one segments all contain fully-developed capsules. With regard to the number of capsules, we find it to be twice as great as that for the small species; this may perhaps be explained by the fact that the segments are twice as long as those of the other species.

There is no doubt that these two forms belong to the same species, and such differences undoubtedly arise from the fact that when the young Cestode arrives in the intestine of its host, it immediately develops its genital organs and ova; later on this development slows, and the development of the genitalia and of the ova takes place much more gradually, *i.e.* occupies a much larger number of segments. Probably both these forms belong to two different infections.

Of the twenty-six species of *Oochoristica* known, seven are found in Africa, four occurring in Reptiles; these are: *O. zonuri*, Baylis, *O. agamae*, Baylis, *O. truncata* (Krabbe), and *O. crassiceps*, Baylis, all different from *O. Theileri* n.sp.

*OPHIOTAENIA MÖNNIGI* n.sp.

Host : *Leptodira hotambeia*. Locality : Pretoria.

This typical Proteocephalid was collected from the intestine of a red-lipped Snake *Leptodira hotambeia*.

The scolex of this only specimen is missing, but the anatomy is sufficiently characteristic to create a new species, for which we propose the above name. This small worm probably does not exceed 50 mm. in length, the greatest width being 1.8 mm. The youngest proglottids are 0.09 mm. long and 0.78 mm. wide, the next segments, showing the genital primordalia, are 0.17 mm. long and 0.9 mm. wide, and the segments in which the genital organs have attained their full development measure 0.79 mm. in length and 0.9 mm. in width. The gravid segments, on the other hand, measure 2.5 mm. in length and 1.5 to 1.8 mm. in width. The segmentation of the strobila is indistinct, as is the case for all *Ophiotaenia* spp.

The *Muscular System* is chiefly formed of longitudinal muscles, whereas transverse and dorso-ventral fibres are scarce. In young proglottids in which the genital primordalia have not yet appeared, the longitudinal muscles form a circular layer 0.04 mm. wide, surrounding the medullary parenchyma : the latter is only 0.03 mm. wide and contains numerous transverse fibres, dorso-ventral fibres being very scarce. We have found occasional calcareous corpuscles. In gravid segments the longitudinal muscle layer is displaced towards the periphery of the segment because the medullary parenchyma is almost entirely occupied by the uterus, which increases the width of the latter by nearly five times. In these segments the longitudinal muscle fibres form a narrower and more irregular layer. Transverse and dorso-ventral fibres are exceedingly scarce.

*Excretory System.*—Two pairs of longitudinal excretory vessels are to be found throughout the entire strobila. The ventral vessels are thin-walled, and measure from 0.03 to 0.04 mm. in diameter. We have been unable to find commissurae nor have we seen any ramifications ; the latter must be scarce, contrary to what is found in the other species of *Ophiotaenia*. The dorsal vessels, 0.008 to 0.012 mm. in diameter, are to be found dorsal to the ventral vessels in the anterior part of the anterior region of the strobila, whereas in the posterior region the former are displaced towards the exterior (see

fig. 2 A). The walls of the dorsal are thicker than those of the ventral vessels and are surrounded by a layer of plasma containing occasional nuclei. In the anterior region of the strobila these vessels are surrounded by a single layer of stout longitudinal muscle fibres, the latter being derived from the longitudinal musculature. We have been unable to study the *foramina secunda* for want of material.

*Nervous System.*—The two longitudinal nerve stems, 0.03 mm. in diameter, are situated close to the lateral borders of the segment, and in places touch the sub-cuticular cell layer. The two accessory nerves, the one dorsal and the other ventral to the main nerve, are exceptionally distinct in the anterior part of the strobila.

The *Genitalia* develop slowly, and open into a fairly deep genital atrium, which alternates irregularly, and which is situated about the middle or slightly posterior to the middle of the border of the segment.

The male genitalia consist of a relatively small egg-shaped *cirrus pouch* with weak muscular walls. The distal portion of the pouch, contrary to what occurs in most of the *Ophiotaenia* spp., does not reach as far as the ventral excretory vessel. The total length of the pouch is 0.2 mm., and the diameter is 0.1 mm. It contains a large muscular cirrus. The coils of the *vas deferens*, situated outside the cirrus pouch and between the latter and the median stem of the uterus, are in places greatly dilated and can attain a diameter even greater than that of the cirrus pouch (0.1 to 0.12 mm.). This portion of the *vas deferens* is at least five to seven times greater than the cirrus pouch, and replaces functionally a *vesicula seminis* which is lacking. Within the cirrus pouch the *vas deferens* may also be dilated, but never forming a distinct *vesicula seminis*. The *testes* occupy two narrow dorsal bands 0.17 mm. wide, situated in the lateral fields of the segment. In mature segments the testes number about 80 and measure from 0.05 to 0.07 mm. in diameter. They are situated to the right and to the left of the dorsal excretory vessels. In gravid segments in which the vessels are displaced, as already stated, they are situated inside of the latter. The *vasa efferentia* form a fine network.

The *Vagina* opens anterior to the cirrus pouch, and presents a slight *sphincter vaginae*; there is no distinct *receptaculum seminis*. The *ovary* forms in the posterior part of the segment a narrow band

just passing beyond the ventral excretory vessels. The ova possess very large nuclei nearly touching one another, so that the ovular plasma does not seem to be very abundant. The ovicapt is hardly developed, the shell gland is median, and is situated dorsally to the ovary. The *vitellaria* occupy two lateral bands situated within the

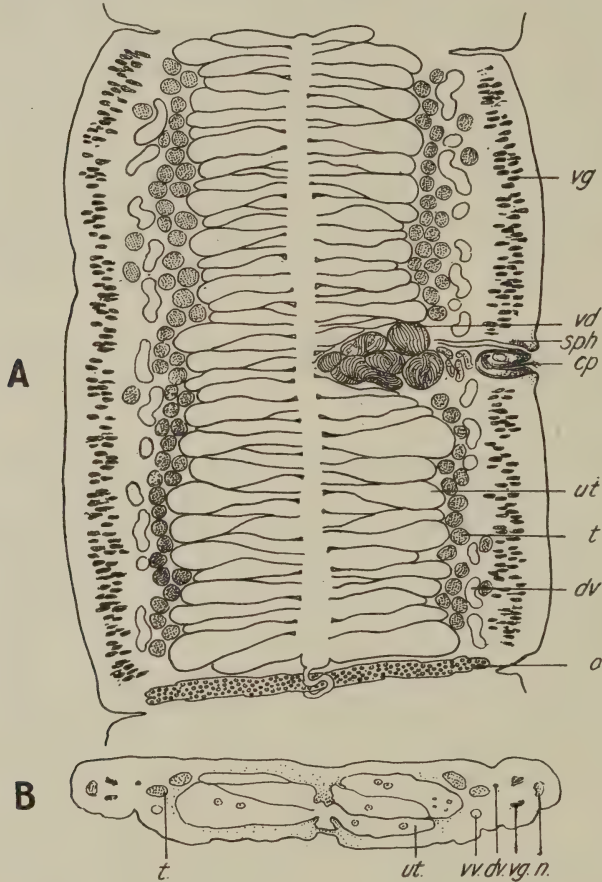


FIG. 2 A and B. *Ophioaenia mönnigi* n.sp. A. Horizontal section of a mature segment. *cp.*—cirrus pouch; *dv.*—dorsal excretory vessel; *o.*—ovary; *sph.*—sphincter vaginae; *t.*—testes; *ut.*—uterus; *vd.*—vas deferens; *vg.*—vitellaria. B. Transverse section of mature proglottis. *n.*—longitudinal; *vv.*—ventral excretory vessel. Other letters as A.

longitudinal nerve stems. The largest follicles are 0.12 mm. wide and 0.03 mm. long measured lengthways with regard to the segment. On transverse sections there are usually to be seen one dorsal and one ventral follicle (see fig. 2 B). The *uterus* is of the typical shape :



from a median stem fifty to fifty-seven diverticula, which are much longer than those of the other *Ophiotaenia* spp. (see fig. 2A), branch off on either side. On transverse sections we were able to observe that it is not a single diverticulum that branches off from the median stem, but at least two, and exceptionally three, diverticula all situated in the same dorso-ventral plane. Therefore, the number of diverticula indicated should be at least twice as great. We were unable to observe any uterine pores; we have, however, observed on the ventral surface of the segments, a certain number of short, irregularly placed diverticula arising from the median stem, and reaching as far as the cuticula, where probably a rupture of the tissues allow the ova to escape. The embryos measure 0.012 to 0.013 mm. in diameter, and are surrounded by two envelopes, of which the exterior and thicker one is 0.03 mm. in diameter.

Our new species, although very characteristic, reminds one of the other South African species placed by Rudin (1917) in the *O. Theileri* group. This group contains the following species: *O. Theileri*, Rudin (South Africa), *O. Zschokkei*, Rudin (South Africa), both found in *Naja* spp., and *O. adiposa*, Rudin (Cameroon), and *O. gabonica*, Beddard (Gaboon) from *Bitis* spp.

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